

まんがサイエンス

あさりよしとお



 NORA COMICS



YOSHITOH ASARI,
BORN IN HOKKAIDO, 1962.
AFTER GRADUATING FROM
TAKIKAWA HIGH SCHOOL,
MOVED TO THE TOKYO
TAXATION BUREAU
OFFICE, AND THEN BECAME
A MANGA ARTIST. HIS
MOST RECOGNIZED WORK
IS "SPACE FAMILY-KARL
BINSON." SINCE
READING "KOROSUKE'S
SCIENCE QUESTION BOX"
IN ELEMENTARY SCHOOL
4TH GRADE HE THOUGHT
HE WANTED TO TRY
WRITING A SCIENCE
MANGA. HIS PARTICULAR
PREFERENCE WAS
CONTENT ABOUT SPACE
DEVELOPMENT. HIS
HOBBIES SPAN A DIVERSE
RANGE OF MOVIES, VIDEO
GAMES, MODEL CARS, AND
COMPUTERS.

MANGA SCIENCE



YOSHITOH ASARI

CONTENTS

LETTUCE IN CAPSULE FORM?.....	
CRAB SHELLS WILL SAVE HUMANITY?.....	
A MICROBE IS A SUPERMAN.....	
SHINING KILLIFISH AND THE LIKE.....	
MAKING DRESSES FROM MILK.....	
WHICH IS A SWEET WATERMELON?.....	
PAPER DIAPERS WILL SAVE THE EARTH?.....	
MEDICINE TO MAKE YOU SMARTER?.....	
COLORLESS, BUT COLORFUL?.....	
A MIRACULOUS MEDICINE WHICH PREVENTS CAVITIES?.....	
IN 2007, ROBOTS WILL BECOME SNAKES?.....	
SQUID CALCULATORS, AND CUTLASS FISH NAIL POLISH?.....	
THE THINNER, THE MORE AMAZING?.....	
IRON POWDER TEACHES US ABOUT HIDDEN CODES.....	
ATTACK OF THE COMPUTER VIRUS!.....	
YOUR HANDS CAN MAKE YOU SMARTER?.....	
CITY RATS LOVE COMPUTERS?.....	
GOING TO SPACE MAKES YOU GO TO THE TOILET?.....	
666 DAYS ON MARS: A SPACE JOURNEY.....	
THE 110 THOUSAND-YEAR-OLD STORY OF A SUPERNOVA.....	
YOUR BODY IS MADE OF STARSTUFF?.....	
IS THERE A 10TH PLANET IN THE SOLAR SYSTEM?.....	
WHEN IS MT. FUJI GOING TO ERUPT?.....	
RETRIEVE THE AIR FROM 300 MILLION YEARS AGO!.....	
SO-SO SPACE-SHIP EARTH!.....	
DID DINOSAUROIDS EXIST?.....	
DO ALIENS EXIST?.....	

THE COMICS CONTAINED IN THIS VOLUME WERE FEATURED IN "5 YEAR SCIENCE" FROM 1987 TO 1989. THE RESEARCH AND PRODUCTS INTRODUCED IN THESE COMICS REFLECT THOSE OF THE TIME OF PUBLICATION.

LETTUCE IN CAPSULE FORM!?



OH, THIS IS
BEAUTIFUL.
WHAT IS IT?

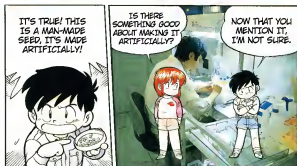
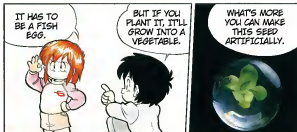


THAT'S A
LETTUCE
SEED.

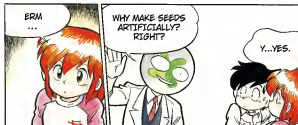


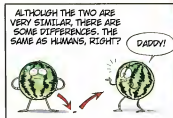
HUH!? CAN YOU
GET PLANT
SEEDS IN THAT
SHAPE?

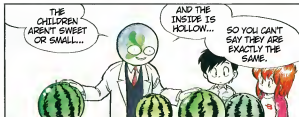




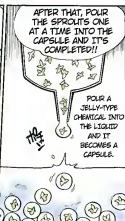
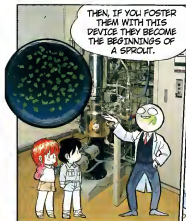
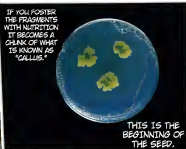
LET'S COPY VEGETABLES!

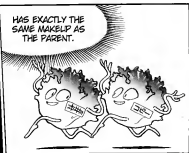






1 MILLION FROM 1G OF LETTUCE!!

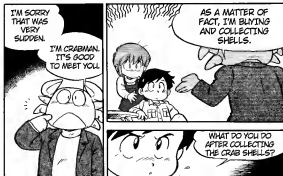






**CRAB SHELLS
WILL SAVE
MANKIND!?**

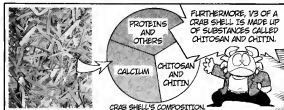




YOU CAN EAT CRAB SHELLS!



THE MANY WAYS TO USE CRAB SHELLS



IN FACT, THERE ARE A VARIETY OF WAYS THAT CHITOSAN AND CHITIN ARE BEING USED.

IN PROCESSING SEWAGE

CHITIN HAS A SUBSTANCE THAT HARDENS STAINS THAT HAVE MELTED IN WATER. THE WATER CAN BE RE-USED.

IN BEAUTY PRODUCTS

CHITIN, WHICH KEEPS MOISTURE AND HAS AIR PERMEABILITY, IS USED IN CREAMS AND A VARIETY OF LUXURIOUS BEAUTY PRODUCTS.

IN SPEAKERS

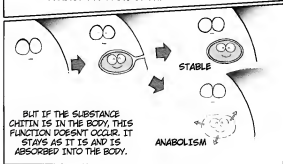
IF YOU USE CHITIN IN BASS VIBRATION PLATES, THEY PRODUCE A GREAT SOUND.

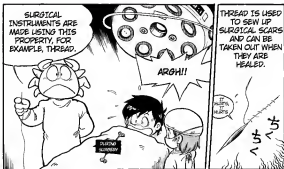
CRAB BEAUTY PRODUCTS?

CRAB SPEAKERS?

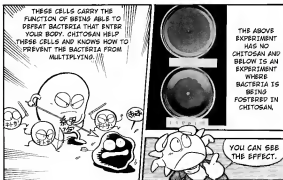
DON'T BE SILLY!

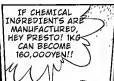
CHITIN'S CONNECTION TO THE HUMAN BODY





CRAB SHELLS CAN ALSO BECOME MEDICINE!?

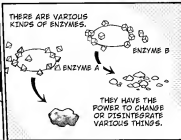




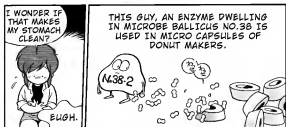


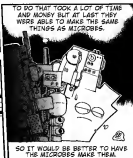
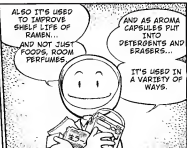


THE AGE OF MICROBE POWER!!

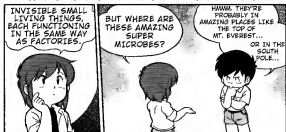








WHERE ARE SUPER MICROBES?



CONVERSELY,
WHEN THERE ARE
SO MANY,
FINDING ONLY
USEFUL SUPER
MICROBES...

CAN TAKE
MANY, MANY
YEARS.

BECAUSE THERE'S
NO WAY TO CHECK
THEM EXCEPT ONE
BY ONE.

HUH! THAT
LONG!?

THIS RESEARCH
RELIES ON
INTUITION AND
PERSEVERANCE.

DISCOVERING
THEM IS
REALLY
TOUGH.



THE LATEST
SCIENCE IS
SURPRISINGLY
PRIMITIVE...

IF YOU FOSTER IT
SUCCESSFULLY YOU
MIGHT FIND ANOTHER
NEW SUPER MICROBE.

HUH! WHAT
HAPPENED?



THAT'S RIGHT.
THUS DROP 1
DROP INTO THE
PETRI DISH
...





SHINING KILLIFISH AND THE LIKE



OK, HAVE A LOOK
AT THIS. IF YOU USE
A MACHINE TO TAKE
PHOTOS OF REGULAR
KILLIFISH EGGS THAT
CAN CAPTURE LITTLE
BITS OF LIGHT...

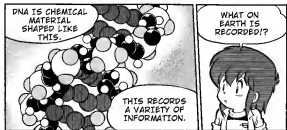


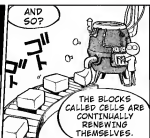
WHOA!? THE
KILLIFISH IS
SHINING!?

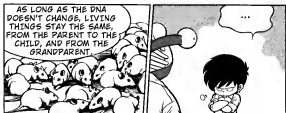




A MICRO LIBRARY INSIDE THE BODY!?





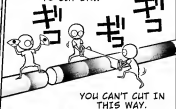


DNA IS A BLUEPRINT FOR MAKING THE BODY

FIRST IF WE CHECK THE DNA OF A FIREFLY AND LOOK FOR THE ORGAN THAT GIVES ORDERS TO MAKE LIGHT...

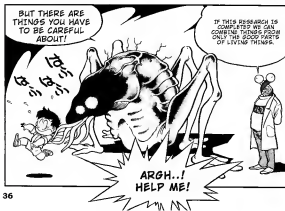


WHEN THE PART IS FOUND YOU DON'T NEED TO CUT IT...

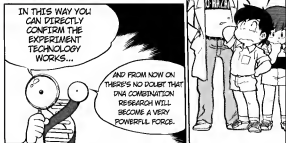
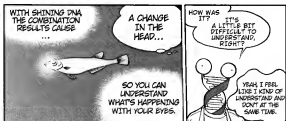


IF THAT'S DONE, CELLS INCREASE AND WHEN THE BODY IS CREATED...









MAKING DRESSES FROM MILK



WELL IF WE
DON'T TRY IT,
WE WON'T
KNOW.



DO YOU WANT TO
EAT PANGAKES?



IT'S STRANGE. I
WONDER HOW
MILK CAN
BECOME
CLOTHES?



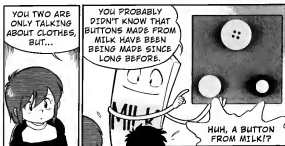
YE-AH.

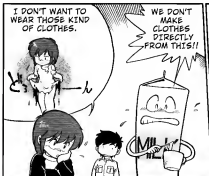
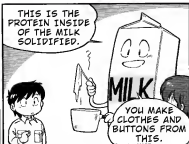


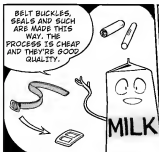
AS I THOUGHT,
MAKING CLOTHES
FROM FOOD IS
IMPOSSIBLE.



YOU CAN MAKE A BUTTON FROM MILK.









THESE ARE CLOTHES MADE FROM MILK!!




SYNTHETIC
FIBER
(POLYESTER)



FIBER MADE
FROM MILK
(PROMIX)




NATURAL
FIBER
(SILK)




THIS FIBER KNOWN
AS PROMIX, IS
COMPLETELY NEW
AND COMPOSED OF
THE BEST SIDES OF
BOTH SYNTHETIC
AND NATURAL
FIBERS.

WATER	DOESN'T ABSORB	ABSORBS	ABSORBS
FLAME	WEAK	STRONG	STRONG
MOLD	STRONG	STRONG	WEAK
MAINTENANCE	NOT NEEDED	NOT NEEDED	NEEDED

IT'S
STRONG AND
BEAUTIFUL.



HOW ABOUT IT
THEN. CLOTHES
MADE FROM MILK
ARE PRETTY COOL
AREN'T THEY!!



I SEE.

SO IT'S
NOT SILK,
IT'S MILK.



OH!

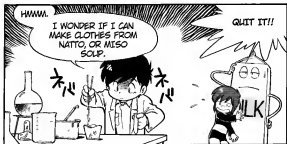
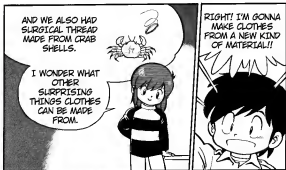


ANYWAY DO YOU
UNDERSTAND
WHAT I'VE TOLD
YOU?

YEAH.

...





WHICH IS A SWEET WATERMELON?



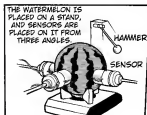


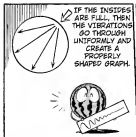


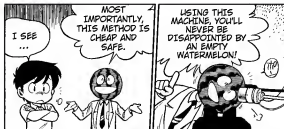




SOUNDS TELL YOU EVERYTHING!?





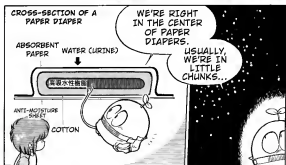
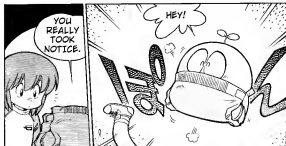


PAPER DIAPERS WILL
SAVE THE EARTH!?





WORLD-CHANGING HIGHLY ABSORBENT PLASTICS



WHEN YOU INSERT US, HIGHLY ABSORBENT PLASTIC, INTO THE WATER, IT CHANGES LIKE THIS.

INSERT HIGHLY ABSORBENT PLASTIC



WATER HARDENS



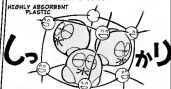
IT HARDENED UP LIKE JELLY ALL OF A SUDDEN.

DIFFERENT FROM SPONGES AND COTTON, WHICH LEAK WATER IF YOU SQUEEZE THEM...



WE GRAB ONTO THE WATER AT THE MICRO LEVEL.

HIGHLY ABSORBENT PLASTIC



SO EVEN IF YOU SQUEEZE IT, THE WATER WON'T COME OUT, AND WE SUCK UP 1000X OUR WEIGHT IN WATER.

WE'RE USED IN MANY DIFFERENT PRODUCTS BECAUSE OF THESE PROPERTIES.

WATER-CUTTING SHEETS

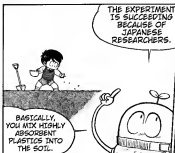


PORTABLE TOILETS



REFRIGERANTS

TURNING DESERTS INTO GREEN LAND WITH PAPER DIAPERS!?



DESERTS
NORMALLY GET
VERY LITTLE RAIN.



EVEN IF YOU KEEP
GIVING IT WATER, IT
JUST EVAPORATES...



OR IT GETS
ABSORBED DEEP
IN THE SOIL.

WITHOUT WATER,
PLANTS WON'T GROW.



IS THERE NO WAY TO
FILL THE SURFACE UP
WITH WATER...?

SEED GROWING CONDITIONS

1) PREPARE DRY SOIL
AND WET SOIL, AND
PLANT SEEDS IN EACH
ONE.



OK, LET'S
DO AN
EXPERIMENT.

DRY SOIL



WET
SOIL

2) THE SEEDS IN
THE WET SOIL
WILL SPROUT, BUT
THE ONES IN THE
DRY SOIL ARE
AS-IS.



DRY SOIL



WET SOIL

SO YOU LEAVE IT
ALONE FOR A FEW
DAYS...?

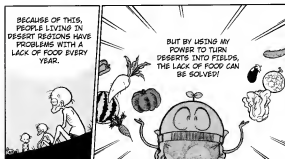
WATER IS
NECESSARY FOR A
SEED TO GROW.

APART FROM WATER,
THE PROPER AMOUNTS
OF WARMTH AND AIR
ARE NECESSARY AS
WELL.





GROWING DESERTS AND THE FUTURE OF THE EARTH

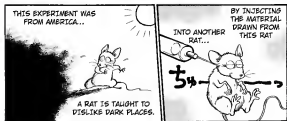
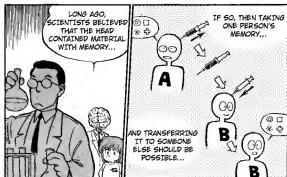


MEDICINE TO MAKE YOU SMARTER!?

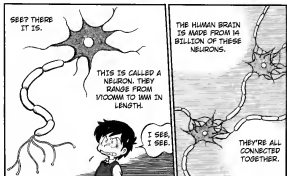


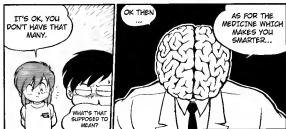
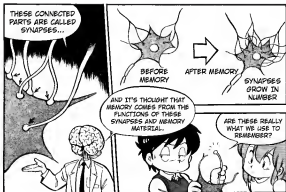


IS MEMORY CAUSED BY MATERIAL FUNCTIONS...?

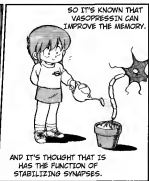
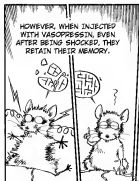


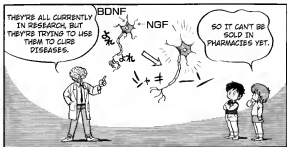
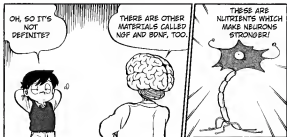
THE HUMAN BRAIN IS FULL OF CELLS



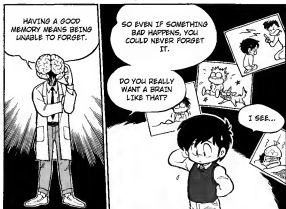


VASOPRESSIN: MAKES YOU SMARTER!?

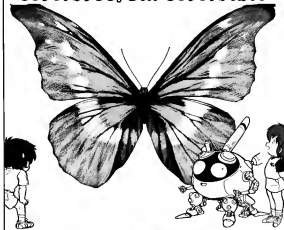




IF YOUR MEMORY IS TOO GOOD...



COLORLESS, BUT COLORFUL!?



IN SOUTH AMERICA, THERE IS A BUTTERFLY CALLED THE MORPHO, WHOSE WINGS SHINE BLUE.



IT STARTED WITH RESEARCH INTO WHETHER THAT BLUE COLOR COULD BE MADE INTO PAINT...



...AND SOMEONE ATTEMPTED TO DRAW THE BLUE PIGMENT FROM A BUTTERFLY'S WINGS.

BUT...



ONLY BROWN PIGMENT
WAS EXTRACTED FROM
THAT BUTTERFLY'S WING.

DR. PEKER

HUH?

SO IT WAS REALLY
A BROWN-WINGED
BUTTERFLY?

NO WAY, IT'S
OBVIOUSLY GOT
BLUE WINGS...

IT ONLY HAS
BROWN PIGMENT...

BUT WITH PAINT, IF IT
HAS RED PIGMENT,
THEN IT'S RED...



IF IT HAS YELLOW
PIGMENT, THEN IT'S
YELLOW, SO THAT'S
WEIRD.

HOWEVER...

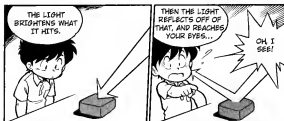
AS
RESEARCH CONTINUED,
IT WAS FOUND THAT
THE BUTTERFLY'S BLUE
COLOR HAD NOTHING
TO DO WITH PIGMENT!

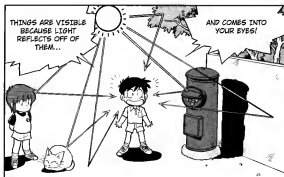
HUH?

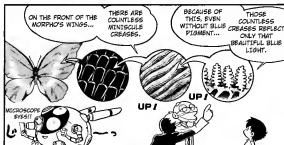
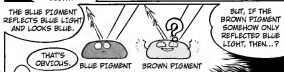
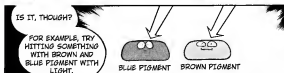
THE MORPHO'S
WING COLOR
WASN'T FROM ITS
PIGMENT.

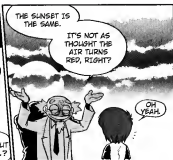












A MIRACULOUS MEDICINE WHICH PREVENTS CAVITIES!?



HUH? YOSHIO,
DO YOU HAVE A
CAVITY?



YEAH.

IT'S BECAUSE YOU
DON'T BRUSH YOUR
TEETH EVERYDAY.



BUT IT'S SUCH A
HASSLE.



I WISH THERE WAS A
MEDICINE THAT WOULD
PREVENT CAVITIES.

HA-HA MAN

HAA HAHHAH! THAT
MEDICINE ACTUALLY
EXISTS!!

LEAVE TEETH-RELATED
MATTERS TO ME!!

FIRST, LET'S THINK
WHY WE GET
CAVITIES.

BECAUSE WE
HAVE TEETH,
RIGHT?

HOW CAVITIES FORM



WHEN YOU EAT
FOOD, ESPECIALLY
SWEETS...



THE CAVITY
BACTERIA CALLED
STREPTOCOCCUS
MUTANS USES
THAT FOOD TO
CREATE MATTER
CALLED GLUCAN.



DOES GLUCAN
CREATE CAVITIES?



ネバ



NO, IT'S JUST A
STICKY SUBSTANCE.

BUT THAT STICKINESS,
STAYS THERE.



CAVITY BACTERIA USES
THAT TO STICK TO THE
TOOTH'S SURFACE.



THAT'S NOT ALL. OTHER
BACTERIA STICK TO THE
STICKINESS, AND THE
STICKINESS SPREADS.



THIS IS HOW PLAQUE IS
CREATED.

SO PLAQUE IS ACTUALLY A
BLINCH OF CAVITY BACTERIA.



BBW, I FEEL SICK.



SINCE PLAQUE
WON'T DISSOLVE
IN WATER...



YOU CAN'T GET
IT OFF BY
JUST
GARGLING.

EVEN CAVITY
BACTERIA, WHICH
IS WEAK ALL BY
ITSELF...



IS PROTECTED BY
PLAQUE, AND
BECOMES
STRONGER.



SO EVEN HARD TEETH GET
DESTROYED.

はははは



CAVITY BACTERIA MAKES PLAQUE INTO ITS BASE, AND THEN MAKES LACTIC ACID WHICH MELTS TEETH.

OK! YOU'VE NOTICED
FROM THAT EXPLANATION
THAT WITHOUT A CERTAIN
THING, CAVITIES WON'T
FORM, RIGHT?

YEAH, WE DON'T
NEED TEETH!

THAT'S RIGHT! IF WE
DIDN'T HAVE TEETH...



NO, IT'S FOOD WE
SHOULDN'T EAT.

IF YOU DIDN'T EAT,
THEN YOU'D DIE, TOO!

NOPE!

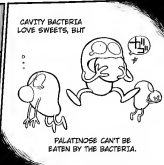
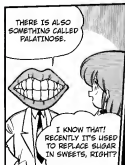
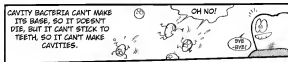
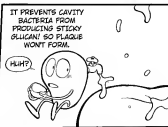


ESH, THIS IS THE
HARDEST PROBLEM
WE'VE FACED SINCE
MANGA SCIENCE
BEGAN!

IT'S NOT SOLVABLE BY
SIMPLY PREVENTING
PLAQUE FROM BEING
MADE!

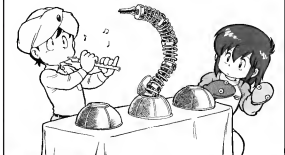


IT'S HERE! ANTICAVITY MATERIAL





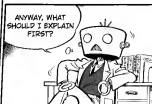
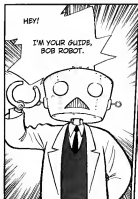
IN 2001, ROBOTS WILL BECOME SNAKES!?

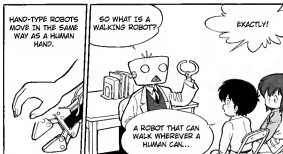


SHE DOESN'T GET IT...



WHAT IS A ROBOT!?





AFTER RESEARCHING HOW VARIOUS ANIMALS WALK, THE SNAKE-TYPE AND SPIDER-TYPE ROBOTS WERE CREATED.



SPIDER-TYPE ROBOT TITAN II

SNAKE-TYPE ROBOT "KORYU" AND ITS CREATOR, DR. HIROSE.

SNAKES' ENTIRE BODIES ARE MADE OF HANDS/FEET.

WALK



GRAB



THIS MAKES FOR WASTELESS FORM AND MOVEMENT.

DR. HIROSE NOTICED THIS, AND KEPT A PET SNAKE FOR 4 YEARS, OBSERVING IT.



HE MUST REALLY LOVE SNAKES.



THAT'S NOT IT.

AS A RESULT, A SNAKE-TYPE ROBOT THAT COULD WALK ANYWHERE WAS CREATED.



BUT CAN'T TANKS AND
BULLDOZERS MOVE
AROUND ANYWHERE
MORE FREELY?

I THOUGHT
YOU'D SAY
THAT.

OK, LET'S TRY
COMPARING THEM!

STAIRS

IT CLIMBS LIKE A
SNAKE, LIFTING ITS
BODY PART BY PART.

IT CAN CLIMB IF
IT'S LOW.

GAPS

CROSSES LIKE
A SNAKE.

FALLS INTO THE GAP
FROM THE FRONT.

AND THERE'S
THIS... I
SAID LIKE A
SNAKE, IT CAN
MOVE AROUND
OBJECTS
WITHOUT
BREAKING
THEM.

IT CAN ENTER AND MOVE
AROUND IN ANY SPACE
EASILY. THIS IS THE SNAKE
ROBOT'S STRONG POINT!!



INTERNAL STOMACH
CAMERA ROBOTS USING
THIS FUNCTION ARE
BEING
RESEARCHED AS WELL.

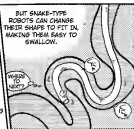


UP TILL NOW, STOMACH
CAMERAS COULD TURN
FREELY...



BUT WHEN
SWALLOWED,
THEY'D MOVE
AROUND, MAKING
IT PAINFUL TO
SWALLOW.

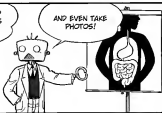
BUT SNAKE-TYPE
ROBOTS CAN CHANGE
THEIR SHAPE TO FIT IN,
MAKING THEM EASY TO
SWALLOW.



NOW, YOU CAN SEND
CAMERAS TO PLACES
NEVER BEFORE
POSSIBLE...

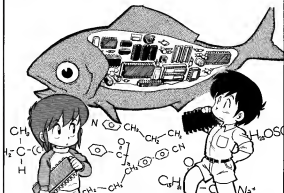


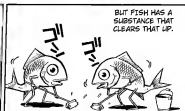
AND EVEN TAKE
PHOTOS!

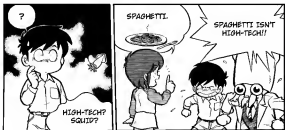
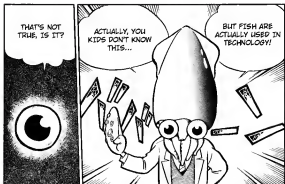




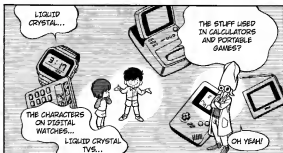
SQUID CALCULATORS, AND CUTLASS FISH NAIL POLISH!?



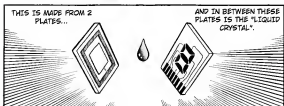
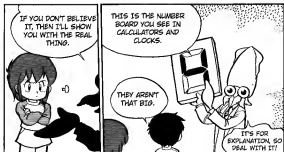


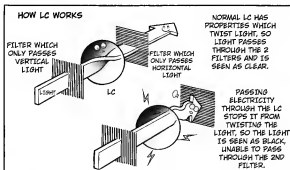


CALCULATOR NUMBERS ARE SQUID OIL!?

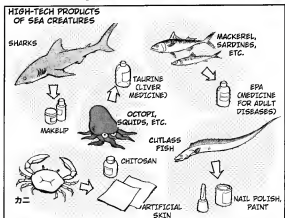


WHAT IS LC?





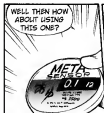
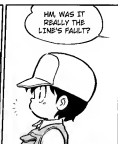
EVEN MORE HIGH-TECH FISH





THE THINNER, THE MORE
AMAZING!







THIS IS CALLED
SUPERFINE
METAL!

IT'S A
NEWLY-MADE
THIN, SOFT,
STRONG TYPE
OF IRON.

THREADY



ARE YOU JUST
MAKING THIS
STUFF UP, OLD
MAN?



IRON IS HARD...

AND USUALLY THE
THINNER IT GETS,
THE WEAKER.



I CAN'T BELIEVE THEY'D
MADE IRON INTO
THREAD!

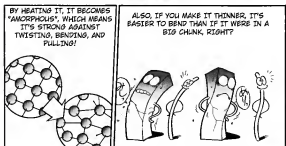


THIS SUPERFINE
METAL IS WHAT
PROVED THAT LOGIC
WRONG!

IRON THINNER THAN HAIR!?



WHY IS IT SO THIN YET STRONG?



IRON CAN GO TO SPACE, TOO!

BUT HOWEVER STRONG
THE SUPERFINE METAL
IS...



IT'S USELESS AS-IS.

BY BUNCHING OR
STRINGING TOGETHER
SEVERAL THREADS...



BUNCHED
TOGETHER.

THIS IS HOW
FISHING LINE
IS MADE.

SEWN TOGETHER
LIKE CLOTH.



STRUNG
TOGETHER.

IT'S MADE INTO A
CLOTH TO BE USED.

IT'S MUCH LIGHTER
THAN IRON OF THE
SAME STRENGTH...



AND IT CAN BE
BENT EASILY!



I?
SEE.

UNTIL NOW, IRON WAS TOO HEAVY TO
BE USED, BUT WITH THE EMERGENCE
OF "STRONG, LIGHT IRON", IRON WILL
BE USED IN AIRPLANES AND
SPACESHIPS.



OR EVEN
CLOSER TO
HOME, THERE'S
SKIS...

AND GOLF
CLUBS WHICH
USE IT.



IT CAN EVEN
BE USED IN
CLOTHES.



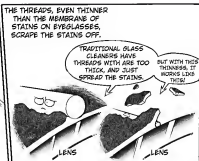
IRON
CLOTHES?



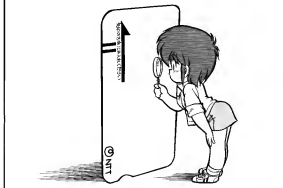
THAT'S
JUST
ARMOR.

OTHER FINE THINGS

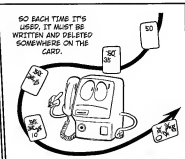




IRON POWDER TEACHES US ABOUT HIDDEN CODES

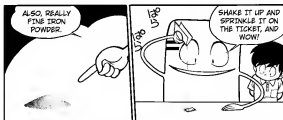


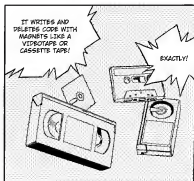


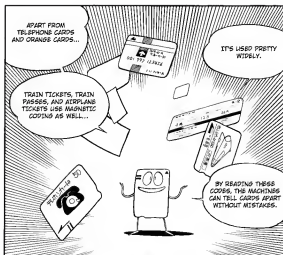




MYSTERIOUS LINES BROUGHT UP BY IRON POWDER



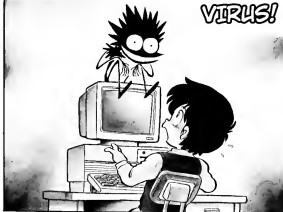


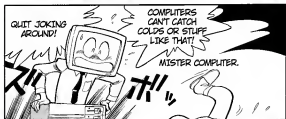




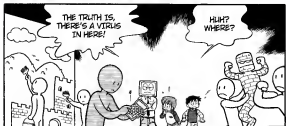
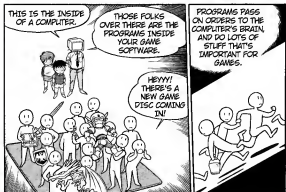


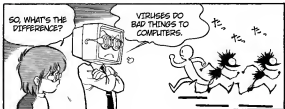
ATTACK OF THE COMPUTER VIRUS!





JUST WHAT IS A COMPUTER VIRUS?





COMPUTER VIRUSES: MASTERS OF DISGUISE!

A VIRAL PROGRAM LIES IN WAIT ON A DISC, ETC., AND WHEN YOU PUT IT INTO YOUR COMPUTER...



IT CAUSES TROUBLE FOR NORMAL PROGRAMS...



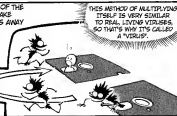
IT ERASES PROGRAMS AND DATA...



IT USES THE COPYING POWER OF THE COMPUTER'S "BRAIN" TO MAKE COPIES OF ITSELF, AND STAYS AWAY ON OTHER DISCS!



THIS METHOD OF MULTIPLYING ITSELF IS VERY SIMILAR TO REAL, LIVING VIRUSES, SO THAT'S WHY IT'S CALLED A "VIRUS".

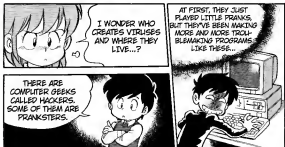
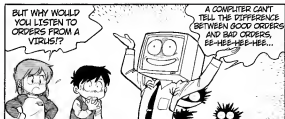


THERE ARE ALSO VIRUSES THAT CAN LIE IN WAIT IN A DISC OR INSIDE A COMPUTER...

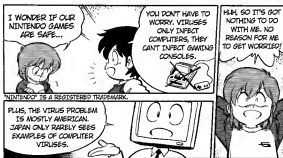
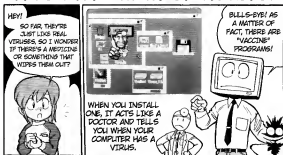


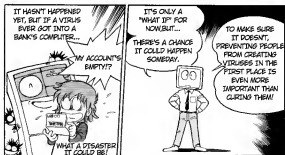
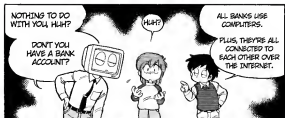
AND COME BURSTING OUT SUDDENLY ONE DAY.



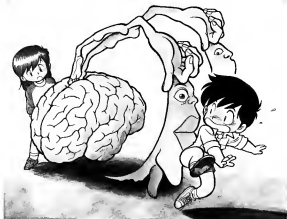


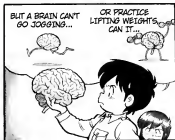
LET'S WIPE OUT THOSE VIRUSES!

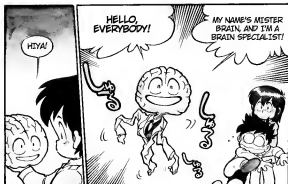




YOUR HANDS CAN MAKE
YOU SMARTER!?

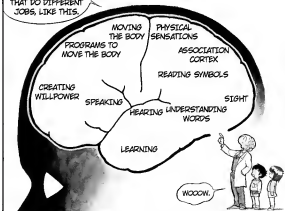




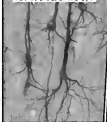


THE DIVISION OF FUNCTIONS IN THE HUMAN BRAIN

THE BRAIN IS
SPLIT UP OR GROUPED
TOGETHER INTO PARTS
THAT DO DIFFERENT
JOBS, LIKE THIS.



FURTHERMORE, THE
BRAIN AND THE BODY
ARE CONNECTED WITH
NERVES LIKE THESE.

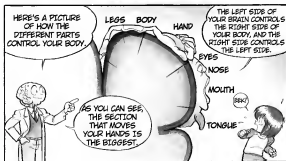
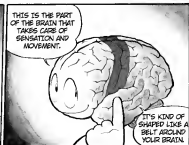


THE BRAIN'S JOB
IS TO RECEIVE AND
PROCESS MESSAGES
FROM THE NERVES.

EVEN WHEN YOU'RE
JUST USING YOUR
HAND, MANY PARTS OF
YOUR BRAIN HAVE TO
WORK HARD.



FOR BRAIN EXERCISES, HANDS RULE!



FROM THIS, WE CAN SEE THAT MOVING OUR HANDS USES THE LARGEST AREA OF OUR BRAINS!



ALSO, THERE'S ONE MORE MAJOR STORY THAT SHOWS THE RELATIONSHIP BETWEEN OUR BRAINS AND OUR HANDS. LONG AGO, HUMANS WERE ANIMALS VERY SIMILAR TO MONKEYS, BUT...



WHEN WE STOOD UP ON TWO LEGS AND STARTED TO USE OUR HANDS, SOMETHING MYSTERIOUS HAPPENED...



OUR BRAINS, WHICH HADN'T CHANGED SIZE IN MILLIONS OF YEARS, GREW MUCH LARGER IN JUST A FEW MILLION YEARS.

AFTER ABOUT 15 MILLION YEARS, OUR BRAINS DOUBLED IN SIZE, AND IN ANOTHER MILLION, THEY HAD TRIPLED!



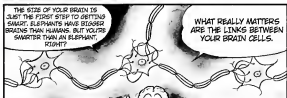
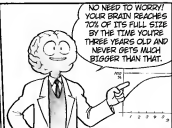
BY LOOKING AT THIS, WE CAN SEE THAT USING OUR HANDS HELPED DEVELOP OUR BRAINS.



WOW, REALLY...?



SOMETHING HAPPENS TO YOUR BRAIN AT AGE 10!



WEIGHT OF A HUMAN BRAIN = ABOUT 1300-1400G, WEIGHT OF AN ELEPHANT BRAIN = ABOUT 5000G.

ALSO, THE SIZE OF YOUR
BRAIN IS DECIDED WHEN
YOU'RE THREE, BUT THE
CONTENT'S ARE DECIDED
AT ABOUT YOU KIDS' AGE.

THE
CONTENT'S?



RIGHT NOW, YOU KIDS
ARE LIVING IN JAPAN
AND SPEAKING
JAPANESE, YES?

BUT IF YOU SUDDENLY
HAD TO MOVE AWAY
TO ANOTHER COUNTRY,
THE LANGUAGE
WOULD BE TOTALLY
DIFFERENT THERE.



WHEN THAT HAPPENS, A
VERY SMALL CHILD
(YOUNGER THAN 10) WILL
FORGET HIS ORIGINAL
LANGUAGE.

ON THE OTHER HAND, PEOPLE WHO
ARE ALREADY IN MIDDLE OR HIGH
SCHOOL WON'T FORGET THEIR
ORIGINAL LANGUAGE, BUT THEY
HAVE TROUBLE LEARNING A NEW
LANGUAGE.



BY THE WAY, BRAINS THAT ARE ABOUT 10 YEARS OLD, LIKE YOU KIDS', CAN LEARN TO USE BOTH LANGUAGES.



FRANKLY, THAT'S BECAUSE YOUR HEADS ARE STILL MALLEABLE!



WELL, MAYBE NOT THAT MALLEABLE...



AN ELDERLY BRAIN HAS ALREADY DECIDED HOW AND WHEN IT DOES WHAT.



COMPARED TO THAT, A YOUNGER BRAIN CAN CHANGE AROUND HOW IT DOES JOBS DEPENDING ON OUTSIDE STIMULI OR ITS OWN CONDITION, AND CAN ADD NEW FUNCTIONS!



IN OTHER WORDS, ONCE YOU TURN 10, THAT'S YOUR LAST CHANCE TO MAKE YOUR BRAIN BIGGER.



IS THAT SO? I GUESS I SHOULD MOVE TO A FOREIGN COUNTRY AS WELL AS DOING HAND EXERCISES.



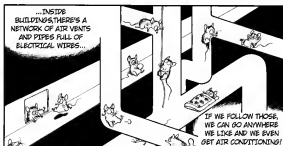
NO WAY!



CITY RATS LOVE COMPUTERS?







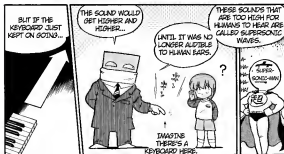
RATS CAN PARALYZE CITIES

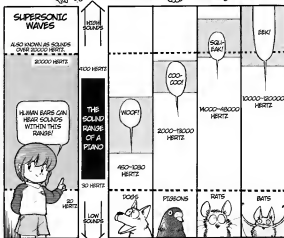


COMPUTERS CALL TO RATS?

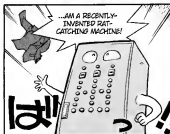


WHAT'S A SUPERSONIC WAVE?





LET'S CATCH RATS WITH SUPERSONIC WAVES!



GOING TO SPACE MAKES YOU GO TO THE TOILET?

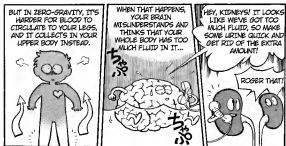


ZERO-GRAVITY SOFTENS YOU UP!



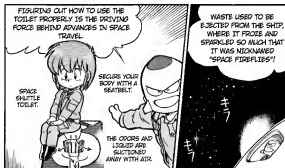


ZERO-GRAVITY IS NO WALK IN THE PARK!





CONQUER THE TOILET AND YOU'VE CONQUERED SPACE!



IF YOU JUST KEEP EATING FOOD IN YOUR
SPACESHIP AND DISPOSING OF IT WITH
THE TOILET...

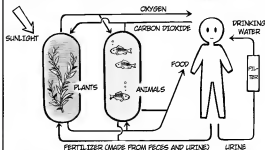
SOON THERE WILL BE NOTHING
LEFT! IT'S IMPOSSIBLE TO JUST
GET SOME MORE SOMEWHERE IN
SPACE!



A SINGLE HUMAN REQUIRES SOME OF VARIOUS RESOURCES PER DAY.

BUT, IF YOU BRING PLANTS ALONG AND
FERTILIZE THEM WITH HUMAN WASTE
PRODUCTS, YOU CAN EAT THE PLANTS AND
USE THEM TO RAISE ANIMALS. PLUS,
THEY CAN PRODUCE OXYGEN.

BY CREATING A CIRCULATING SYSTEM
IN THIS WAY, IT'S POSSIBLE TO LIVE
FOR QUITE A LONG TIME IN A
SPACESHIP USING A LIMITED AMOUNT
OF RESOURCES.



IF THIS CAN BE MADE A
REALITY, THEN SPACE TRAVEL
THAT LASTS EVEN FOR YEARS
WILL NO LONGER BE THE
STUFF OF DREAMS!



EXPERIMENTAL
SYSTEMS ARE ALREADY
BEING COMPLETED.

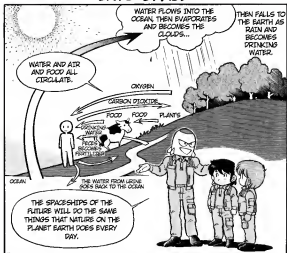


PLANT
CULTIVATING
MACHINE

THESE FISH SURVIVE ON THE OXYGEN PRODUCED
BY THE PLANTS, AND THEIR FECES HELPS THE
PLANTS TO GROW.



TAKING THE EARTH WITH US INTO SPACE







668 DAYS ON MARS: A SPACE JOURNEY



WE'RE OFF TO MARS!

THAT'S A
SPACESHIP
DESIGNED TO
GO TO MARS.
ISN'T IT.



I GUESS
WE
TRANSFER
ABOARD
HERE!



THE MARS-BOUND SPACESHIP, "MARS ONE",
WILL DEPART FROM ORBIT AROUND EARTH.

WELCOME TO THE
MARS MISSION!



THIS IS FLIGHT
NUMBER 123,
BOUND
FOR MARS BY WAY
OF VENUS.



MY NAME IS MARTIN
THE MARTIAN, AND
I'LL BE YOUR TOUR
GUIDE FOR THIS
TRIP.



IF YOU HAVE ANY
QUESTIONS AT
ALL...



HOW COME WE'RE
GOING TO MARS BY
WAY OF VENUS?



ISN'T THAT AN
AWFULLY LONG
DETOUR?

THAT IS BECAUSE THE VARIOUS PLANETS ORBIT THE SUN AT DIFFERENT SPEEDS.



AND THE PLANETS THAT ARE CLOSER TO THE SUN ORBIT IT MORE QUICKLY.



BECAUSE OF THAT, SOMETIMES EARTH AND MARS ARE VERY CLOSE TOGETHER...



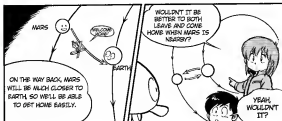
AND SOMETIMES THEY'RE VERY FAR APART.

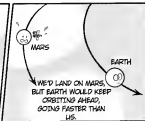


THIS SPACESHIP IS LEAVING EARTH WHILE MARS IS QUITE FAR AWAY, SO WE'LL BE TAKING A TURN AROUND VENUS ON THE WAY THERE.



ON THE WAY BACK, MARS WILL BE MUCH CLOSER TO EARTH, SO WE'LL BE ABLE TO GET HOME EASILY.





TRAVELLING TO MARS TAKES A TIGHT BUDGET!



IT'S ONLY WATER, WE SHOULD HAVE JUST BROUGHT ALONG AS MUCH AS WE NEED!



YOU MIGHT CALL IT "JUST WATER", BUT...



HUMANS USE UP 4 LITERS OF WATER, PER PERSON, PER DAY. TO SUPPLY ONE PERSON FOR 660 DAYS, YOU'D NEED 2,640 LITERS.

THERE ARE 11 PEOPLE ON THIS SHIP, SO...

THAT'S A TOTAL OF ABOUT 30 THOUSAND LITERS!



30 THOUSAND LITERS OF WATER WOULD WEIGH 30 TONS!

THAT'S AS MUCH AS 150 FULL OIL DRUMS!



ACK, WE'D HAVE NO PLACE TO PUT IT ALL!

AND THE PROBLEM ISN'T JUST WITH WATER! WE'D NEED A KILOGRAM OF FOOD PER PERSON, PER DAY, SO THAT'S A TOTAL OF OVER 7 TONS!

PLUS, WE'D NEED 800 TONS OF FUEL TO CARRY IT ALL UP INTO SPACE WOULD TAKE OVER 20 SPACE SHUTTLES!!

HOW MUCH MONEY DO YOU THINK THAT WOULD COST?

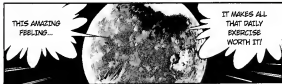


LUXURY IS YOUR WORST ENEMY IN SPACE!

A SPACESHIP IS A TRAINING GYM!



AT LAST, A MARS LANDING!

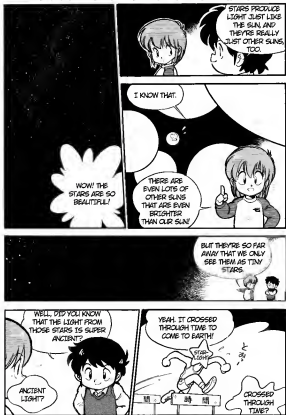


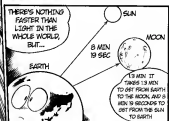
2100 MONITORING

超新星 1987A

THE 170 THOUSAND- YEAR-OLD STORY OF A SUPERNOVA

STARLIGHT IS A TIME MACHINE?







THE DISTANCE THAT LIGHT CAN CROSS IN ONE YEAR'S TIME IS CALLED A "LIGHT YEAR".



STARLIGHT FROM 17 THOUSAND LIGHT-YEARS AWAY



A SUPERNOVA IS THE DEATH OF A STAR?



AFTER IT EXPLODES,
WHAT'S LEFT IS GAS.



THE CRAB NEBULA WAS
CREATED THIS WAY.
ITS EXPLOSION WAS
OBSERVED 500 YEARS
AGO.

SO THE LIGHT OF
A SUPERNOVA IS
THE LIGHT OF A
DYING STAR.

WELL, YES,
BUT...



...SINCE IT TOOK 170
THOUSAND YEARS TO
REACH EARTH...

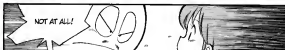
STARLIGHT!



THAT MEANS IT DIED
170 THOUSAND YEARS
AGO...THAT'S SO SAD,
SOMEHOW.



NOT AT ALL!

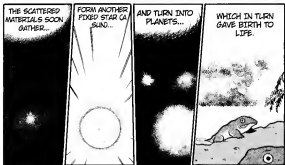


IN A SUPERNOVA
EXPLOSION, AT THE SAME
TIME THAT THE STAR IS
DYING...

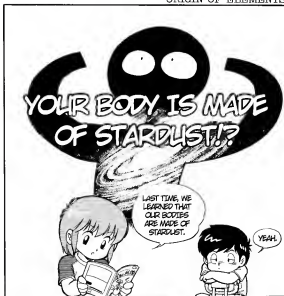


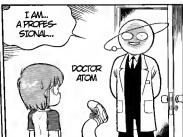
...MANY STARS
ARE BEING
BORN!

SUPERNOVAS CREATING SPACE

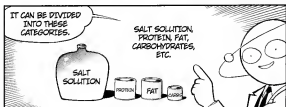
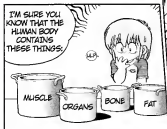




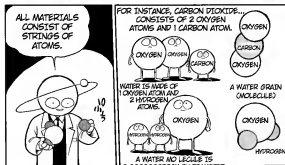




OPENING UP THE HUMAN BODY

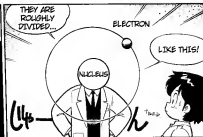


THE ATOM PUZZLE THAT CREATES ALL





CAN ATOMS BE
SPLIT UP EVEN
FURTHER?



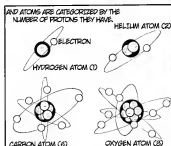
THEY ARE
ROUGHLY
DIVIDED...

ELECTRON

LIKE THIS!



INSIDE THE
NUCLEUS WE CAN
FIND PROTONS...



AND ATOMS ARE CATEGORIZED BY THE
NUMBER OF PROTONS THEY HAVE.

HELIUM ATOM (2)

ELECTRON

HYDROGEN ATOM (1)

CARBON ATOM (6)

OXYGEN ATOM (8)



THE MORE
PROTONS AN ATOM
HAS, THE HEAVIER
AND BIGGER IT
GETS.

URANIUM

IRON

NITROGEN

OXYGEN

HYDROGEN

HELIUM

LITHIUM



LONG AGO, WHEN THE
UNIVERSE HAD ONLY
JUST BEGUN, THERE WAS
NOTHING BUT HYDROGEN.

THE HYDROGEN
GATHERED AND
FORMED STARS.

INSIDE THE
STARS, THE
HYDROGEN ATOMS
CLING TOGETHER
TO FORM HELIUM
ATOMS...



AND HELIUM TURNED INTO
CARBON AND OXYGEN...



AND CARBON AND OXYGEN
FORMED INTO EVEN
HEAVIER ATOMS.



THESE HEAVY ATOMS
STARTED GATHERING AT
THE CENTER OF THE STARS.

THROUGH THE PULLING POWER
OF THE HEAVY ATOMS AT THEIR
CENTER, THE STARS STARTED
SHRINKING. BUT EVEN WHILE
SHRINKING, THE HEAVY ATOMS
KEPT INCREASING.



AND WHEN IRON, WITH 26
PROTONS, STARTED FORMING...



THE STARS WERE
CRUSHED BY THEIR OWN
WEIGHT AND EXPLODED!



THIS IS WHAT IS
CALLED A SUPERNOVA.

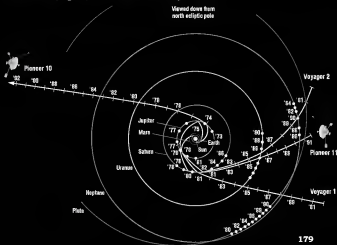




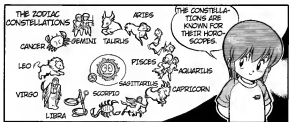
IS THERE A 10TH PLANET IN THE SOLAR SYSTEM?

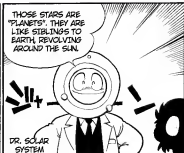
SOLAR SYSTEM

Viewed down from
north ecliptic pole

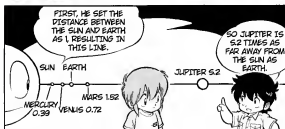


THE SUN, THE MOON AND THE PLANETS HAVE BEEN AROUND FOR A LONG TIME





URANUS PREDICTED BY A STRANGE FORMULA



		ACTUAL DISTANCE
MERCURY	$(4+3 \times 0) \div 10 = 0.4$	0.38
VENUS	$(4+3 \times 1) \div 10 = 0.7$	0.72
EARTH	$(4+3 \times 2) \div 10 = 1$	1
MARS	$(4+3 \times 2 \times 2) \div 10 = 1.8$	1.52
?	$(4+3 \times 2 \times 2 \times 2) \div 10 = 2.8$?
JUPITER	$(4+3 \times 2 \times 2 \times 2 \times 2) \div 10 = 5.2$	5.20
SATURN	$(4+3 \times 2 \times 2 \times 2 \times 2 \times 2) \div 10 = 10$	9.55
URANUS	$(4+3 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2) \div 10 = 19.6$	19.22

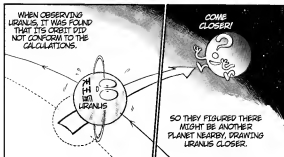
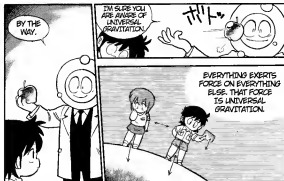
TITIUS EXPLAINED THE DISTANCE BETWEEN THE SUN AND THE PLANETS WITH THIS FORMULA.

AND HE WAS VERY CLOSE. URANUS WAS FOUND BY ADDING AN EXTRA 2 TO THE CALCULATION FOR SATURN.

THE ASTEROID THAT WAS FOUND IN THE EMPTY SEAT



NEPTUNE AND PLUTO FOUND THROUGH GRAVITY



IN SEPTEMBER 1846 LE VERRIER FROM FRANCE USED THIS IDEA TO CALCULATE THE ORBIT OF THE NEW PLANET.

HE SENT HIS RESULTS TO GALLE IN GERMANY.



AND GALLE FOUND THE NEW PLANET THAT VERY EVENING.

1846

IT'S RIGHT THERE, LE VERRIER SAID

THAT'S HOW NEPTUNE WAS FOUND.

BUT NEPTUNE WAS SLIGHTLY OFF ITS ORBIT TOO.



LOWELL CONTINUED THE CALCULATIONS, CONVINCED OF THE EXISTENCE OF A NEW PLANET...



BUT HE PASSED AWAY BEFORE FINDING IT.

BUT HIS ASSISTANT TOMBAUGH CONTINUED HIS WORK, AND IN MARCH 1930...



FOUND IT!

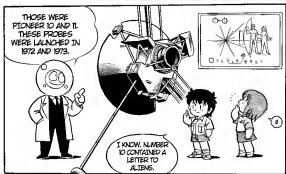
USING PHOTOGRAPH TECHNOLOGY, HE FOUND PLUTO, SEVERAL BILLION KILOMETERS AWAY.



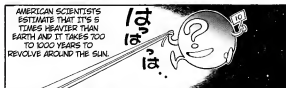
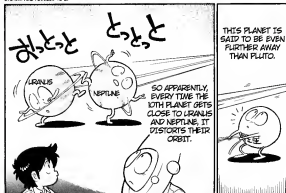
TOMBAUGH SPENT A TOTAL OF 100 HOURS STARING AT PHOTOS BEFORE FINDING PLUTO.



FIND IT WITH PROBES!! THE 10TH PLANET



THIS COMIC WAS LATE IN "10TH YEAR SCIENCE" IN 1991. PLUTO WAS THE 9TH PLANET AT THAT TIME, BUT AT A GENERAL MEETING OF THE INTERNATIONAL ASTRONOMICAL UNION IN AUGUST 2006, A DISTINCTION WAS MADE BETWEEN "PLANETS" AND "DWARF PLANETS" AND SINCE PLUTO WAS CATEGORIZED AS A "DWARF PLANET", THE NUMBER OF PLANETS IN OUR SOLAR SYSTEM WAS REDUCED TO 8.



IN JANUARY 2005, A CELESTIAL BODY SLIGHTLY LARGER THAN PLUTO WAS DISCOVERED ON THE OUTSIDE OF PLUTO AND IT WAS SAID TO BE THE 10TH PLANET, BUT IT DID NOT MEET THE REQUIREMENTS FOR A "PLANET" SO IT WAS GIVEN A "DWARF PLANET" IN SEPTEMBER 2006 AND NAMED "ERIS".



WHEN IS MT. FUJI GOING TO ERUPT?



IZU OSHIMA 1986

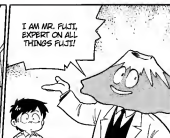


MIYAKEJIMA 1983





YES, HELLO?



I AM MR. FUJI,
EXPERT ON ALL
THINGS FUJI!



WHAT?

YOU WANT TO KNOW
IF FUJI IS REALLY A
VOLCANO?

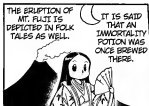


HOW INSOLENT YOU
ARE. MT. FUJI WAS
MADE BY A VOLCANIC
ERUPTION.

BO

IT ERUPTED MANY
TIMES, AND THAT'S
HOW IT BECAME
THIS BIG.

LOOK AT THIS
CROSS-SECTION!
THERE ARE LAYERS
OF ASHES AND LAVA.



THE ERUPTION OF
MT. FUJI IS
DEPICTED IN FOLK
TALES AS WELL.

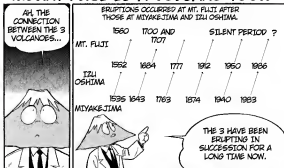
IT IS SAID
THAT AN
IMMORTALITY
POTION WAS
ONCE BREWED
THERE.

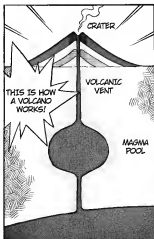


THERE, DOES THAT
ANSWER YOUR
QUESTION?

WE HAVEN'T
EVEN ASKED
ANYTHING YET!

MOUNT FUJI IS A VOLCANO TOO!!





THIS IS HOW
A VOLCANO
WORKS!

VOLCANIC
VENT

MAGMA
POOL

AS YOU CAN SEE,
THERE IS A MAGMA
POOL SEVERAL
KILOMETERS BELOW
THE GROUND.



IT'S KIND OF
LIKE A
REVERSED
DROPPER.

THERE IS LAVA
INSIDE, AND WHEN
IT IS
PRESSURIZED
BY THE
ENVIRONMENT...

おや



I SEE...

I THOUGHT I
WAS ON TO
SOMETHING
THERE...

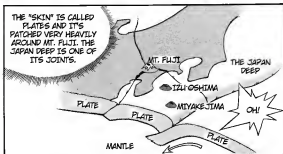
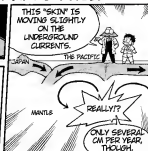
IF ALL VOLCANOES
WERE CONNECTED
UNDERGROUND...



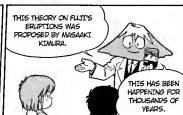
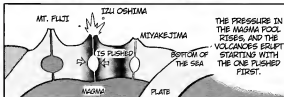
THEY WOULD
ALL ERUPT AT
THE SAME
TIME.



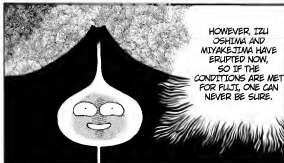
THE BOTTOM OF THE SEA IS MOVING TOWARDS FUJI!



HOW A VOLCANO ERUPTS



WILL FUJI ERUPT!?



CARBON DIOXIDE

RETRIEVE THE AIR FROM 300 MILLION YEARS AGO!

THESE STONES ARE
ALL MADE OF GAS.

WHAT?!



WOW... IT
REALLY IS
FULL OF GAS.



BUT WHY IS
CARBON DIOXIDE
INSIDE ROCKS?



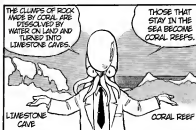
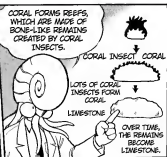
OH, SO YOU
DON'T KNOW
EVERYTHING,
THEN?



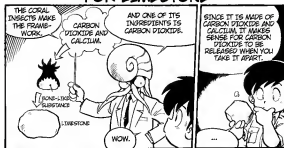
THE HILLS USED TO BE SEA







CARBON DIOXIDE IS AN INGREDIENT FOR LIMESTONE



LULRRGGH!!
I CAN'T
BREATHE!!

THERE WAS NO
OXYGEN IN THE
AIR 4 BILLION
YEARS AGO.



201



THE SEA GAVE BIRTH
TO LIFE, WHICH STARTED
GATHERING CARBON
DIOXIDE.



I SEE...

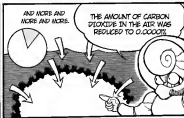
SO THERE WERE
LOTS OF CORAL
INSECTS IN THE
SEA 300 MILLION
YEARS AGO TOO.



THE CORAL
INSECTS GATHER
CARBON DIOXIDE.



MORE AND MORE...



AND MORE AND
MORE AND MORE.

THE AMOUNT OF CARBON
DIOXIDE IN THE AIR WAS
REDUCED TO 0.00001.



SO THE CARBON
DIOXIDE IN THIS ROCK
IS 300 BILLION YEARS
OLD.

WOW, IT'S LIKE
A TIME CAPSULE
OF THE AIR!



HEY, THE CARBON
DIOXIDE IS GONE...

BUT THERE'S
NO OXYGEN.

IT'S PLANTS THAT
USED CARBON
DIOXIDE TO CREATE
THEIR ROOTS AND
RELEASED OXYGEN.



THE OXYGEN CREATED IN
THE SEA SLOWLY AMASSED
IN THE AIR OVER SEVERAL
HUNDRED MILLION YEARS.



THE AMOUNT OF OXYGEN
IN THE AIR INCREASED,
AND LIFE VENTURED
ONTO LAND.



CARBON DIOXIDE



AND THAT'S HOW
THE CURRENT AIR
WAS MADE.



YOU CAN TAKE YOUR
MASKS OFF NOW.



IT'S BEEN 4.6
BILLION YEARS
SINCE THE CREATION
OF EARTH.



THE AIR WAS MADE
BY MANY DIFFERENT
CREATURES.

THEY CREATED THE
EARTH'S ATMOSPHERE
OVER HUNDREDS OF
MILLIONS OF YEARS.



SO WE'D BETTER
TAKE GOOD CARE
OF IT.

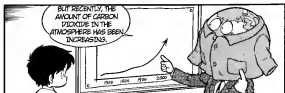


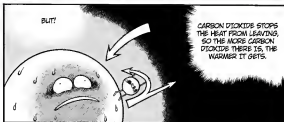
SOS SPACESHIP EARTH!





HEAT DOESN'T RETURN TO SPACE!?





THE GREENHOUSE EFFECT MUST BE STOPPED!



THE GREENHOUSE EFFECT
CREATES NUMEROUS
GASES, RESULTING IN A
TEMPERATURE INCREASE
OF 4.8 AFTER 40 YEARS.

GAS
DENSITY

TEMPERATURE

THIS WILL CAUSE
ICEBERGS TO
MELT.

AND WHAT
HAPPENS
THEN?

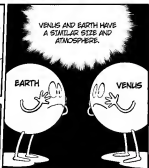
THE SEA LEVEL WILL
RISE 1M AND DROWN
THE LAND!!

THE POLAR
BEARS WILL BE
WITHOUT A
HOME!

NO!!

BUT...

IT'S ONLY 1M,
RIGHT?









DID DINOSAUROIDS EXIST?

DINOSAUROID



HEY, WHAT IS THIS THING?



THAT IS A DINOSAUR.

DOCTOR DINOSAUR

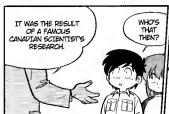


IF THIS TROODON HERE WOULD HAVE EVOLVED WITHOUT BECOMING EXTINCT, IT MIGHT HAVE TURNED INTO THIS.

OH, SO IT'S ONLY MAKE-BELIEF.



IT IS NOT MAKE-BELIEF!



IT WAS THE RESULT OF A FAMOUS CANADIAN SCIENTIST'S RESEARCH.

WHO'S THAT THEN?



ME.

WHAT IF DINOSAURS HAD CONTINUED EVOLVING?

ANYWAY...

ARE YOU FAMILIAR WITH THE TERM EVOLUTION?



TAKE THE ELEPHANT...

ITS ANCESTORS HAD A SHORT SNOUT.



BUT NOW IT HAS A LONG ONE, USEFUL FOR GRABBING OBJECTS.



THE ANCESTORS OF THE GIRAFFE DIDN'T HAVE LONG NECKS EITHER.



BUT OVER THE COURSE OF TIME, ITS NECK GREW AND IT BECAME ABLE TO REACH FOOD IN HIGH PLACES.



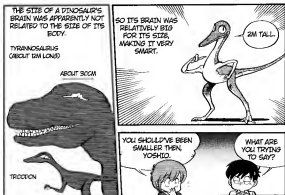
THE CHANGES IN THE BODY OF A CREATURE ARE CALLED "EVOLUTION".

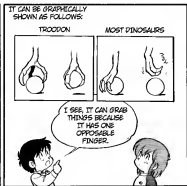
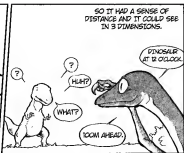


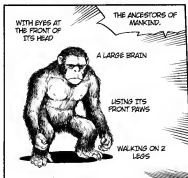
LIKE PEOPLE TURNING INTO PIGS WHEN THEY EAT TOO MUCH.

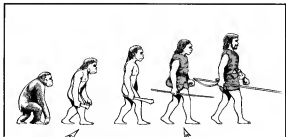
THAT'S NOT THE SAME!









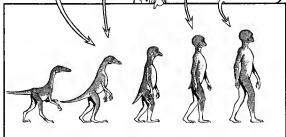


ITS BRAIN EVOLVES,
BECOMING HEAVIER,
REQUIRING IT TO
STRAIGHTEN ITS BACK
FOR SUPPORT.

IN ORDER TO WALK ON
2 LEGS PROPERLY, IT
WALKS WITH ITS HEELS
ON THE GROUND.

ITS BRUSH GROWS
THE BACK OF ITS
HEAD DEVELOPS AND
ITS JAWBONE GROWS
SMALLER.

ITS TAIL IS
LOST BECAUSE
OF DISUSE.



EVOLUTION INVOLVES MANY
THINGS:

- ITS BODY GROWS BIGGER
- IT DEVELOPS
DISTINCTIVE
FEATURES (EARS, SNOUT,
NECK)
- IT CHANGES ITS
HABITAT ETC.

THAT'S WHY IT IS
THOUGHT THAT THE
TROODON COULD HAVE
DEVELOPED INTO AN
INTELLIGENT
DINOSAUROID.

IF DINOSAUROIDS HAD REALLY EXISTED...





IN 1969, A UFO LANDED IN A PARK IN THE SOVIET UNION AND 3 ALIENS CAME OUT!



THEY WERE 3M TALL, HAD 3 EYES AND SAID THEY CAME FROM A RED PLANET IN THE LIBRA CONSTELLATION.

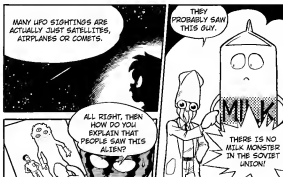
ONE EYE-WITNESS WAS SHOT WITH AN ALIEN GUN AND DISAPPEARED...

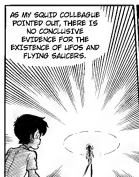


BUT AFTER THE UFO HAD LEFT, HE SUDDENLY REAPPEARED AGAIN.









IN THE BEGINNING OF THE UNIVERSE, THERE WAS NOTHING BUT HYDROGEN GAS.

UNTIL IT BECAME THE UNIVERSE WE HAVE TODAY.

THERE IS AN INFINITE NUMBER OF STARS LIKE THE SUN IN THE UNIVERSE.

OVER THE COURSE OF 15 BILLION YEARS, IT GATHERED AND EXPLODED...

THE PLACE AND TIME OF BIRTH AND THE SIZE OF THESE STARS ARE ALL DIFFERENT...

BUT THEY WERE ALL BORN IN THE SAME WAY AS OUR SUN.

THE SUN HAS MANY PLANETS REVOLVING AROUND IT, AND ONE OF THEM IS EARTH.

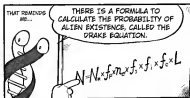
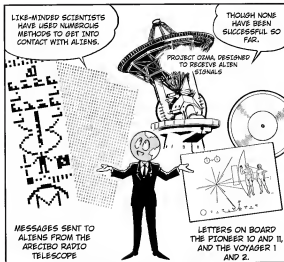
EARTH IS HOME TO HUMANS AND MANY OTHER CREATURES.

IF YOU CONSIDER THAT OUR SUN IS REALLY NOTHING SPECIAL IN THE UNIVERSE...

THAT MEANS THAT THERE COULD BE A PLACE LIKE EARTH SOMEWHERE ELSE!

DENYING THE EXISTENCE OF OTHER STARS LIKE IT,

IS LIKE DENYING THE EXISTENCE OF EARTH ITSELF.





THE END



LIST OF COLLABORATORS, FIRST APPEARANCES

ALL OF THESE VOLUMES ARE PART OF "5 YEAR SCIENCE"

"LETTUCE IN CAPSULE FORM?"	COLLABORATION: KIRIN BEER CO.,LTD PHOTOS= SHOICHIRO HATTORI VOL. 4/1989
"CRAB SHELLS WILL SAVE MANKIND?"	COLLABORATION: TOTTORI UNIVERSITY PROFESSOR SHIGESHIRO HERANO NIPPON CHEMICALS CO.,LTD, KYOWASEIRO CO.,LTD FINEGARS CO.,LTD, KANEBO CO., LTD PANASONIC CO.,LTD TANWE FOODS VOL. 5/1988
"A MICROBE IS A SUPERMAN"	COLLABORATION: TOKYO INSTITUTE OF TECHNOLOGY PROFESSOR KOUKI HORIKOSHI VOL. 8/1989
"SHINING KILLIFISH AND THE LIKE"	COLLABORATION: TOKYO UNIVERSITY PROFESSOR MASAO KARUBE, TOKYO UNIVERSITY ASSISTANT PROFESSOR EICHI TAMURA VOL. 2/1990
"MAKING DRESSES FROM MILK"	COLLABORATION: TOYOCO CO.,LTD IRIS CO.,LTD ISBTAN CO.,LTD PHOTOS=KEISUKE SASAZUKA VOL. 4/1989
"WHICH IS A SWEET WATERMELON?"	COLLABORATION: MAKI MANUFACTURING CO.,LTD VOL. 9/1989
"PAPER PLAINERS WILL SAVE THE EARTH?"	COLLABORATION: TOTTORI UNIVERSITY, ASSISTANT PROFESSOR MASAO TOYAMA VOL. 4/1988
"MEDICINE TO MAKE YOU SMARTER?"	COLLABORATION: NIPPON MEDICAL SCHOOL, PROFESSOR YOSHIYA SHINAGAWA VOL. 1/1989
"COLORLESS, BUT COLORFUL?"	COLLABORATION: SOPHIA UNIVERSITY, PROFESSOR KIYOSHI AOKI, SOPHIA UNIVERSITY, ASSISTANT PROFESSOR AKIHIRO YOSHIDA VOL. 8/1990
"CITY RATS LOVE COMPUTERS?"	COLLABORATION: IKARI CORPORATION VOL. 2/1988
"IN 2001, ROBOTS WILL BECOME SNAKES?"	COLLABORATION: TOKYO INSTITUTE OF TECHNOLOGY, ASSISTANT PROFESSOR SHIGEYO HIROSE VOL.12/1989
"SQUID CALCULATORS, AND OUTLAGE FISH NAIL POLISH?"	COLLABORATION: NISSUI CO., LTD VOL. 12/1989

"THE THINNER, THE MORE AMAZING!"	COLLABORATION = KOBE STEEL, LTD. VOL. 11/1989
"IRON POWDER TEACHES US ABOUT HIDDEN CODES"	PHOTOS = NAOTO TOMIZAWA VOL. 10/1989
"ATTACK OF THE COMPUTER VIRUS!"	COLLABORATION = WAMU PRODUCTIONS, HIROSHI FUKUTSU PINEAPPLE 88000 PHOTOS = YUKITAKA KOSUGI VOL. 2/1989
"YOUR HANDS CAN MAKE YOU SMARTER!"	COLLABORATION = NIPPON MEDICAL SCHOOL PROFESSOR YOSHIOA SHINAGAWA VOL. 5/1989
"A MIRACULOUS MEDICINE WHICH PREVENTS CAVITIES?"	VOL. 3/1989
"GOING TO SPACE MAKES YOU GO TO THE TOILET?"	COLLABORATION = NATIONAL AEROSPACE LABORATORY OF JAPAN, KOJI OTSUBO, VOL. 3/1988
"668 DAYS ON MARS: A SPACE JOURNEY COLLABORATION"	= SCIENTIFIC CRITIC, IMAO ETO
"THE 170 THOUSAND-YEAR-OLD STORY OF A SUPERNOVA"	COLLABORATION = GOTOH PLANETARIUM & ASTRONOMY MUSEUM, NAOTO KIMURA PHOTOS = NASA VOL. 1/1988
"YOUR BODY IS MADE OF STARDUST?"	COLLABORATION = NATIONAL INSTITUTE OF RADIOLOGICAL SCIENCES, YASUTO IGARASHI VOL. 8/1988
"IS THERE A 10TH PLANET IN THE SOLAR SYSTEM?"	COLLABORATION = GOTOH PLANETARIUM & ASTRONOMY MUSEUM, MAKOTO KUNISHI PHOTOS = NASA VOL. 12/1987
"WHEN IS MT. FUJI GOING TO ERUPT?"	COLLABORATION = UNIVERSITY OF THE RYUKYUS ASSISTANT PROFESSOR MASAOKI KIMURA VOL. 7/1988
"RETRIEVE THE AIR FROM 300 MILLION YEARS AGO!"	COLLABORATION = SUBIYAMA JOGAKUEN UNIVERSITY PROFESSOR YASUHI KITANO VOL. 1/1988
"SOS SPACESHIP EARTH!"	VOL. 7/1989
"DID DINOSAUROIDS EXIST?"	COLLABORATION = YOKOHAMA NATIONAL UNIVERSITY PROFESSOR YOSHIKAZU HASEGAWA NATIONAL MUSEUMS OF CANADA VOL. 12/1988
"DO ALIENS EXIST?"	VOL. 3/1990

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